

Curriculum Vitae

Alexander Friedland

Technical Staff Member

Theoretical Division, T-8, MS B285
Los Alamos National Laboratory
Los Alamos, New Mexico 87545-0285
Phone: (505) 664-0083
Email: *friedland@lanl.gov*
<http://alexfriedland.com>

Personal Data:

- Date of Birth: March 17, 1973
- Place of Birth: Saratov, Russia
- Citizenship status: US citizen

Education:

- *Graduate:* Physics Department, UC Berkeley, 1994 – 2000
 - Title of Ph.D. Dissertation: *Towards the Resolution of the Solar Neutrino Problem*
 - Date of completion: *May 2000*
 - Academic Advisor: *Hitoshi Murayama*
- *Undergraduate:* Moscow Institute of Physics and Technology, Russia, 1990 – 1993.

Positions Held:

- **Technical Staff Member**
Theoretical Division, T-8, LANL
Los Alamos, NM
November 2005 - present.
- **Richard P. Feynman Fellow**
Theoretical Division, T-8, LANL
Los Alamos, NM
November 2002 - November 2005 .

- **Postdoctoral Member**

Institute for Advanced Study

Princeton, NJ

September 2000 - October 2002.

- **Graduate Research Assistant**

LBNL & Department of Physics, UC Berkeley

Berkeley, CA

September 1996 - August 2000.

Research Interests:

- *Neutrino Physics:*

- Solar, atmospheric and supernova neutrino physics
 - Measurements of neutrino properties

- *Astrophysics and Cosmology:*

- Particle physics theories of dark energy and dark matter
 - Properties of dark matter
 - Supernova physics: neutrino transport, explosion mechanism, synthesis of heavy elements
 - Magnetic fields in astrophysical problems

- *Particle physics phenomenology*

- Physics of Electroweak Symmetry Breaking
 - Phenomenology of supersymmetric and grand-unified models

- *Quantum effects in many-particle systems*

- Many-particle correlations and coherence with applications to neutrino evolution in dense environments

Teaching Experience:

- Graduate student instructor, Physics Dept., UC Berkeley, 1994-1996, 1999-2000.

- Outstanding Graduate Student Instructor Award, 1996

Publications:

- A. Friedland and A. Gruzinov, *Neutrino signatures of supernova turbulence*, arXiv:astro-ph/0607244.
- A. Friedland and C. Lunardini, *Two modes of searching for new neutrino interactions at MINOS*, arXiv:hep-ph/0606101.
- A. Friedland, B. H. J. McKellar, I. Okuniewicz, *Construction and Analysis of a Simplified Many-Body Neutrino Model*, Phys. Rev. D **73**, 093002 (2006) arXiv:hep-ph/0602016.
- A. Friedland and C. Lunardini, *A test of tau neutrino interactions with atmospheric neutrinos and K2K*, Phys. Rev. D **72**, 053009 (2005) [arXiv:hep-ph/0506143].
- A. Friedland, *Do solar neutrinos probe neutrino electromangetic properties?*, arXiv:hep-ph/0505165.
- A. Friedland, B. H. J. McKellar, I. Okuniewicz, *Construction and Analysis of a Many-Body Neutrino Model*, contributed to the Proceedings of the 16th National Congress 2005, The Australian Institute of Physics, Canberra, Australia
- A. Friedland, *Solar and atmospheric neutrinos and non-standard neutrino interactions*, in Proceedings of the XXI International Conference on Neutrino Physics and Astrophysics (Neutrino 2004), Paris, France, Nucl. Phys. B (Proc. Suppl.) **143C**, 493 (2005).
- A. Friedland, C. Lunardini and M. Maltoni, *Atmospheric neutrinos as probes of neutrino – matter interactions*, Phys. Rev. D **70**, 111301(R) (2004) [arXiv:hep-ph/0408264].
- A. Friedland, C. Lunardini and C. Peña-Garay, *Solar neutrinos as probes of neutrino – matter interactions*, Phys. Lett. B **594**, 347 (2004) [arXiv:hep-ph/0402266].
- A. Friedland and C. Lunardini, *Do many-particle neutrino interactions cause a novel coherent effect?*, JHEP **0310**, 043 (2003) [arXiv:hep-ph/0307140].
- A. Friedland and C. Lunardini, *Neutrino flavor conversion in a neutrino background: Single- versus multi-particle description*, Phys. Rev. D **68**, 013007 (2003) [arXiv:hep-ph/0304055].

- A. Friedland and A. Gruzinov, *Bounds on the magnetic fields in the radiative zone of the Sun*, *Astrophys. J.* **601**, 570 (2004) [arXiv:astro-ph/0211377].
- A. Friedland, H. Murayama and M. Perelstein, *Domain walls as dark energy*, *Phys. Rev. D* **67**, 043519 (2003) [arXiv:astro-ph/0205520].
- A. Friedland and A. Gruzinov, *A new solution to the solar neutrino deficit*, *Astropart. Phys.* **19**, 575 (2003) [arXiv:hep-ph/0202095].
- A. Friedland, *MSW effect for large mixing angles*, Proceedings of the Workshop Frontiers In Contemporary Physics - II, March 2001, Vanderbilt University, Nashville, TN, arXiv:hep-ph/0106042
- A. Aguirre, C. P. Burgess, A. Friedland and D. Nolte, “*Astrophysical constraints on modifying gravity at large distances*,” *Class. Quant. Grav.* **18**, R223 (2001) [arXiv:hep-ph/0105083]; reprinted in “*Searches for the mechanism of gravitation*”, ed. M. A. Ivanov and L. A. Savrov, Nizhnii Novgorod, Russia, 2004
- A. Friedland, *On the evolution of the neutrino state inside the sun*, *Phys. Rev. D* **64**, 013008 (2001) [arXiv:hep-ph/0010231].
- A. Friedland, *Towards the resolution of the solar neutrino problem*, Ph. D. thesis, University of California, Berkeley, May 2000.
- A. de Gouvea, A. Friedland and H. Murayama, *The dark side of the solar neutrino parameter space*, *Phys. Lett. B* **490**, 125 (2000) [arXiv:hep-ph/0002064].
- A. Friedland, *MSW effects in vacuum oscillations*, *Phys. Rev. Lett.* **85**, 936 (2000) [arXiv:hep-ph/0002063].
- A. de Gouvea, A. Friedland and H. Murayama, *Earth matter effect in Be-7 solar neutrino experiments*, *JHEP* **0103**, 009 (2001) [arXiv:hep-ph/9910286].
- A. de Gouvea, A. Friedland and H. Murayama, *Seasonal variations of the Be-7 solar neutrino flux*, *Phys. Rev. D* **60**, 093011 (1999) [arXiv:hep-ph/9904399].
- A. de Gouvea, A. Friedland and H. Murayama, *Seiberg duality and e+ e- experiments*, *Phys. Rev. D* **59**, 105008 (1999) [arXiv:hep-th/9810020].

- A. de Gouvea, A. Friedland and H. Murayama, *Less minimal supersymmetric standard model*, Phys. Rev. D **59**, 095008 (1999) [arXiv:hep-ph/9803481].
- A. de Gouvea, A. Friedland and H. Murayama, *Next-to-minimal supersymmetric standard model with the gauge mediation of supersymmetry breaking*, Phys. Rev. D **57**, 5676 (1998) [arXiv:hep-ph/9711264].

Selected Recent Professional Activities:

- Co-organizer of the workshop *Particle Theory and the LHC*, July 2006, Santa Fe, NM, USA
- Organizer of the workshop *Implications of Neutrino Flavor Oscillations* (INFO 05), July 2005, Santa Fe, NM, USA
- Served on the LANL Laboratory Directed Research & Development Committee (in category Physics)
- Served as a reviewer for the National Science Foundation
- Served as a referee for *Physical Review Letters*, *Physical Review D*, *Physics Letters B*, *Astroparticle Physics*, *Journal of High Energy Physics*, *Journal of Cosmology and Astroparticle Physics*

Recent conference talks/seminars:

- *Santa Fe 06 Cosmology Workshop*, Santa Fe, NM, July 20, 2006.
- *Neutrino 2006*, Plenary talk, Santa Fe, NM, June 15, 2006.
- *California Institute of Technology*, High Energy Physics Seminar, Pasadena, CA, May 15, 2006.
- *UC Davis*, High Energy Physics Seminar, Davis, CA, May 11, 2006.
- *UC Berkeley/LBNL*, particle physics seminar, Berkeley, CA, May 8, 2006.
- *University of Washington*, UW neutrino meeting, Seattle, WA, April 12, 2006.
- *UC San Diego*, astrophysics seminar, La Jolla, CA, April 11, 2006.
- *Sterile Neutrinos in Astrophysics and Cosmology (SNAC 06)*, Crans Montana, Switzerland, March 29, 2006.

- 2nd Workshop of the Physics Working Group for the International Scoping Study for a Neutrino Factory, Boston University, Boston, MA, March 7, 2006.
- Topical Workshop on Physics at Henderson Deep Underground Science and Engineering Lab, Colorado State University, Fort Collins, CO, November 19, 2005.
- University of New Mexico, nuclear, particle, & astroparticle physics seminar, Albuquerque, NM, November 15, 2005.
- PANIC05 Neutrino Satellite Meeting: Future of Neutrino Physics, Santa Fe, NM, October 30, 2005.
- Particles and Nuclei International Conference (PANIC05), Santa Fe, NM, October 27, 2005.
- Implications of Neutrino Flavor Oscillations (INFO05), Santa Fe, NM, July 12, 2005.
- UC Berkeley/LBNL, particle physics seminar, Berkeley, CA, May 23, 2005.
- Institute for Advanced Study, joint phenomenology/astro seminar, Princeton, NJ, October 14, 2004
- New York University, High Energy Physics Seminar, New York, NY, October 6, 2004
- American Physical Society's 2004 Meeting of the Division of Particles and Fields, Riverside, CA, August 30, 2004
- Aspen Center for Physics, Workshop “Lepton number violation: Neutrinos, Leptogenesis, Grand Unified Theories and Beyond”, Aspen, CO, July 9, 2004
- The XXI International Conference on Neutrino Physics and Astrophysics (Neutrino 2004), Paris, France, June 14-19, 2004 (poster)
- Stanford Linear Accelerator Center, Theory Group Seminar, May 7, 2004
- California Institute of Technology, High Energy Physics Seminar, May 3, 2004

- *Cornell University*, Particle Theory Seminar, April 21, 2004
- *Los Alamos National Laboratory*, Physics Division (P-25) Seminar, January 7, 2004